

NON-PUBLIC?: N  
ACCESSION #: 9403080275  
LICENSEE EVENT REPORT (LER)

FACILITY NAME: Salem Generating Station - Unit 1 PAGE: 1 OF 04

DOCKET NUMBER: 05000272

TITLE: Reactor Trip During Startup, On 14 Steam Generator Low-  
Low Level.  
EVENT DATE: 01/27/94 LER #: 94-003-00 REPORT DATE: 02/25/94

OTHER FACILITIES INVOLVED: DOCKET NO: 05000

OPERATING MODE: 1 POWER LEVEL: 009

THIS REPORT IS SUBMITTED PURSUANT TO THE REQUIREMENTS OF 10 CFR  
SECTION:  
50.73(a)(2)(iv)

LICENSEE CONTACT FOR THIS LER:  
NAME: B. W. Leap - LER Coordinator TELEPHONE: (609) 339-5161

COMPONENT FAILURE DESCRIPTION:  
CAUSE: X SYSTEM: SJ COMPONENT: LC MANUFACTURER: W123  
REPORTABLE NPRDS: Y

SUPPLEMENTAL REPORT EXPECTED: NO

#### ABSTRACT:

On 1/2 94, at 2034 hours, during startup following the eleventh refueling outage, a Reactor trip on No. 14 Steam Generator (S/G) low-low level occurred from 9% power. When placed in automatic, the 14BF19/40 level demand signal periodically failed to zero. To compensate, the Nuclear Control Operator (NCO) controlled S/G level by returning the controller to manual and allowing demand signal to return to the program value. During one attempt, the NCO anticipating automatic control circuit recovery of S/G level, delayed transferring control to manual. The automatic control circuit did not recover level and when the NCO transferred to manual, S/G feedwater flow increased causing a level shrink to the 16% low-low setpoint. Emergency Operating Procedure-TRIP-1, "Reactor Trip Or Safety Injection" was entered and the Unit stabilized and placed in Mode 3. The primary root cause of this event is equipment failure of three circuit cards in 14BF19/40 controller. A contributing factor was buildup of sediment in the sensing line to the 14

S/G feedwater flow transmitter. The failed controller circuit cards were replaced and the controller returned to service. Satisfactory channel calibrations were performed on the S/G level control circuits. The sensing lines to the S/G feedwater flow transmitters were blown down and vented to remove sediment and air. A root cause evaluation of the failed components will be performed.

END OF ABSTRACT

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#### PLANT AND SYSTEM IDENTIFICATION:

Westinghouse - Pressurized Water Reactor

Energy Industry Identification System (EIIS) codes are identified in the text as {xx}

#### IDENTIFICATION OF OCCURRENCE:

Reactor Trip During Startup, On 14 Steam Generator Low-Low Level

Event Date: 1/27/94

Report Date: 2/25/94

This report was initiated by Incident Report No. 94-032.

#### CONDITIONS PRIOR TO OCCURRENCE:

Mode 1 Reactor Power 9 % - Unit Load -0- MWe

Startup was in progress following the Unit 1 eleventh refueling outage. Reactor power was being increased, at rate of approximately 6% per hour, from 4% to 20% for post-outage testing. The steam dump valves were maintaining reactor coolant temperature (T sub ave) at approximately 552 degrees Fahrenheit (degrees F).

#### DESCRIPTION OF OCCURRENCE:

On January 27, 1994, at 2034 hours, a Reactor trip occurred due to low-low level in 14 Steam Generator (S/G) while control for S/G feedwater regulating valve, 14BF19, was being transferred to automatic. All Control Rod {AA} shutdown and control banks inserted. Emergency Operating Procedure (EOP)-TRIP-1, "Reactor Trip Or Safety Injection" was entered and the Unit stabilized and placed

in Mode 3.

At 2110 hours (same day) the NRC was notified of this event in accordance with 10CFR50.72(b)(2)(ii).

#### ANALYSIS OF OCCURRENCE:

The low-low S/G level (16%) reactor trip prevents operation with S/G water level below the minimum required for adequate heat removal. The trip setpoint ensures sufficient S/G inventory to mitigate possible auxiliary feedwater (AFW) pump starting delays and prevent S/G dryout and Reactor Coolant System {AB} thermal and hydraulic transients associated with loss of heat sink.

The BF19 valves, in conjunction with their respective BF40 air-operated bypass valves, regulate main feedwater flow during startup and low power operation.

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#### ANALYSIS OF OCCURRENCE: (cont'd)

During startup, level swings were encountered in 14 S/G during attempts to transfer control of 14BF19 to automatic. When placed in automatic, the 14BF19/40 level demand signal periodically failed to zero. To compensate, the Nuclear Control Operator (NCO) would control S/G level by returning the controller to manual and maintain S/G level stable allowing demand signal to return to the program value. During one attempt, the NCO anticipating the automatic control circuit recovery of S/G level, delayed transferring control to manual. The automatic control circuit did not recover level and when the NCO transferred control to manual, S/G feedwater flow increased causing a level shrink to the 16% low-low setpoint. This caused the Reactor Protection System {JC} (RPS) to initiate a Reactor trip. The Unit was stabilized in Mode 3 and Main Steam was isolated, in accordance with EOP-TRIP-2, to limit cooldown of the Reactor Coolant System (RCS).

The NCO's actions in controlling feedwater were satisfactory. Immediately prior to the event, similar problems with the automatic control circuit of the 13 S/G feedwater regulating valve 13BF40 were successfully handled using the same technique.

#### APPARENT CAUSE OF OCCURRENCE:

The cause of this event is equipment failure. The trip was

primarily due to failure of three circuit cards in 14BF19/40 controller 1LC500G (Westinghouse-Hagan 7100 series model number 4111080-004).

A contributing factor was buildup of sediment in the sensing line to the 14 S/G feedwater flow transmitter. Marked improvement in feedwater control was observed after the line was blown down.

#### PREVIOUS OCCURRENCES:

LERs 311/92-007-00 and 311/92-009-00 reported Unit 2 Reactor trips on April 26, and May 14, 1992, due to S/G low low level. Control problems with the 23BF19 controller contributed to each event. As a corrective action, procedures were developed to provide early detection of Westinghouse-Hagan controller circuit card noise problems and to dynamically check controller outputs prior to unit startup activities. This testing was not performed after the Unit 1 eleventh refueling outage. An independent review has concluded that the failure to perform this testing was not a contributor to the trip.

LER 272/93-004-00 reported a Unit 1 Reactor Trip on February 16, 1993. The root cause of that event was attributed to intermittent high contact resistance in the gain selector switch of Overtemperature Delta Temperature Trip (OTDT) input module QM-411B {JC} (Westinghouse-Hagan 7100 series). As a corrective action for that event, a preventive maintenance program for Westinghouse-Hagan modules was developed.

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#### SAFETY SIGNIFICANCE:

This event did not affect the health and safety of the public. It is reportable as an automatic RPS actuation in accordance with 10 CFR50.73(a)(2)(iv).

The RPS functioned as designed and the heat sink was maintained during this event. The reduction in T sub avg, requiring main steamline isolation, has been experienced during other reactor trips (e.g., Unit 1 LER 272/93-002-00 and Unit 2 LER 311/92-009-00). Engineering is investigating T sub avg reduction following trips and potential corrective action are being assessed.

#### CORRECTIVE ACTIONS:

The failed controller circuit cards were replaced and the controller returned to service.

Satisfactory channel calibrations were performed on 11, 12, 13 and 14 S/G level control circuits.

The sensing lines to 11, 12, 13, and 14 S/G feedwater flow transmitters were blown down and vented to remove sediment and air.

A recurring task will be established to periodically blowdown feedwater and steam flow sensing lines.

A root cause evaluation of the failed components of controller 1LC500G will be performed.

The Training Department will review this event and make appropriate changes to the lesson plan for Licensed Operators.

General Manager -  
Salem Operations

MJPJ: pc

SORC Mtg. 94-019

ATTACHMENT TO 9403080275 PAGE 1 OF 1

PSE&G

Public Service Electric and Gas Company P. O. Box 236 Hancocks Bridge,  
New Jersey 08038

Salem Generating Station

February 25, 1994

U. S. Nuclear Regulatory Commission  
Document Control Desk  
Washington, DC 20555

Dear Sir:

SALEM GENERATING STATION  
LICENSE NO. DPR-70  
DOCKET NO. 50-272  
UNIT NO. 1

LICENSEE EVENT REPORT 94-003-00

This Licensee Event Report is being submitted pursuant to the requirements of Code of Federal Regulation 10CFR50.73(a)(2)(iv). Issuance of this report is required within thirty (30) days of event discovery.

Sincerely yours,

J. J. Hagan  
General Manager -  
Salem Operations

MJPJ: pc

Distribution

The Energy People  
94-2189 (10M) 12-89

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